IN THE DRAWINGS

Please replace Figure 4 with the attached Replacement Sheet.

Remarks

Claims 1-9 are pending in the application.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng (X. Zheng et al: "Receiver Optimization for 40-Gb/s Optical Duobinary Signal", IEEE Photonics Technology Letters, Vol. 13, No. 7, July 2001, page 744-746), hereinafter "Zheng") in view of Hayee et al. (M. Hayee: "NRZ Versus RZ in 10-40-Gb/s Dispersion-Managed WDM Transmission Systems", IEEE Photonics Technology Letters, Vol. 11, No. 8, August 1999, page 991-993), hereinafter Hayee, and Lee et al. (US 2004/0101314), hereinafter "Lee."

Each of the various rejections and objections are overcome by amendments that are made to the specification, drawing, and/or claims, as well as, or in the alternative, by various arguments that are presented.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code or is simply clearer and easier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known prior art are being made only with an intent to change the literal scope of such claim in the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Also, since a dependent claim inherently includes the recitations of the claim or chain of claims from which it depends, it is submitted that the scope and content of any dependent claims that have been herein rewritten in independent form is exactly the same as the scope and content of those claims prior to having been rewritten in independent form. That is, although by convention such rewritten claims are labeled herein as having been "amended," it is submitted that only the format, and not the content, of these claims has been changed. This is true whether a dependent claim has been rewritten to expressly include the limitations of those claims on which it formerly depended or whether an

independent claim has been rewriting to include the limitations of claims that previously depended from it. Thus, by such rewriting no equivalent of any subject matter of the original dependent claim is intended to be surrendered. If the Examiner is of a different view, he is respectfully requested to so indicate.

Amendment to the Drawings

Figure 4 has been amended to correct a typographical mistake in the legend for curve 41, which now reads "NRZ-duobinary" (instead of NRV-duobinary). No new matter has been added as a result of this amended drawing.

Rejection Under 35 U.S.C. 103(a)

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng in view of Hayee and Lee.

Applicants submit that Zheng, Hayee and Lee alone or in any permissible combination, fail to teach or suggest Applicants' invention, as a whole.

Zheng discloses simulation of an optical receiver for a 40 Gb/s optical NRZ duobinary signal by optimizing an optical filter and an electrical filter to improve the sensitivity of the signal while maintaining dispersion tolerance (e.g., Abstract).

As stated in the Office Action, Zheng fails to disclose the use of RZ modulation in conjunction with duobinary signal.

Thus, Hayee was cited for disclosing that RZ modulation is less affected by nonlinearity than NRZ, but more susceptible to dispersion than NRZ; and Lee was cited for teaching an RZ-duobinary transmitter. The Office Action further stated that it would have been obvious to combine the RZ-duobinary of Hayee and Lee with Zheng so that both nonlinearity tolerance and dispersion tolerance can be improved, along with reduced ASE noise.

Applicants submit, however, that neither Zheng, Hayee nor Lee provides motivation to combine these references. For example, Zheng stated on p.746, right column, first paragraph, that "[t]he dispersion tolerance is the most important factor for the optical duobinary signal".

Since Zheng teaches dispersion to be the most important factor for the duobinary signal, and Hayee specifically teaches that RZ modulation is more susceptible to dispersion than NRZ, and that "40-Gb/s systems favor the usage of NRZ because dispersion becomes the key limiting factor at 40 Gb/s" (see Hayee's Abstract), there is simply no motivation to combine Zheng with Hayee's RZ modulation, and further with Lee to implement RZ-duobinary transmission.

Thus, one skilled in the art, after reading Zheng and Hayee, would certainly not find it obvious to combine Zheng's 40Gb/s duobinary system with Hayee's RZ modulation. In fact, Applicants submit that both Zheng and Hayee teach away from combining Zheng with Hayee's RZ modulation.

Furthermore, Applicants submit that the use of an optical filter with a bandwidth around B Hz, where B is the bit rate of the optical signal, in conjunction with a RZ-duobinary system, would not have been obvious in view of other conventional teaching.

For example, Fig. 4 of Applicants' specification shows a plot of an optical signal-to-noise ratio (OSNR) required to maintain a constant bit-error-rate as a function of the optical filter bandwidth for both NRZ-duobinary (curve 41) and RZ-duobinary (curve 42) signals in a 10Gb/s system. As explained on p.5, line 30 to p. 7, line 3 of Applicants' specification, one skilled in the art would conclude from curve 42 that the optimum filter bandwidth is about 27GHz (corresponding to a minimum for the required OSNR), i.e., almost 3 times the data bit rate, for the RZ-duobinary signal; instead of the narrower bandwidth of about 10GHz, i.e., 1 times the data bit rate, because the narrower bandwidth would have required a higher OSNR.

That is, conventional teaching from Fig. 4 would not have suggested Applicants' method of using a narrower filter (e.g., 1 times the data bit rate) in a receiver for a RZ-duobinary signal.

This finds further support in Hayee, which teaches on p.991 (right column), that the bandpass filter for RZ format is 4R, where R is the bit rate. Such teaching of the bandwidth for RZ being several times that of the bit rate is indeed typical of conventional teaching. Thus, Applicants' invention of using a bandwidth of 1 times the data bit rate for filtering RX-duobinary signal is simply not taught or suggested by prior art teaching.

Furthermore, even if one were to combine RZ-duobinary with the use of a filter in the receiver, it is not obvious that such a system would necessarily be functional. For example, signal detection through the narrower band filter relies on the phase relationships in the RZ duobinary signal. Since nonlinearities in the transmission fiber can affect the phase relationships in the signal, one cannot assume that the integrity of the transmitted signal can be sufficiently maintained for the use of the narrower band filter in the receiver.

However, as shown in Applicants' Fig. 2, not only is the use of such a filter feasible in a receiver for a RZ-duobinary signal, it also provides significant improvement in chromatic dispersion tolerance compared to a filter with a larger bandwidth. This is certainly not taught or suggested by any of the cited references.

As such, Zheng, Hayee and Lee, alone or in any permissible combination, fail to teach or suggest each and every element of Applicants' invention of at least independent claim 1, as a whole.

Independent claims 3, 4, 6, 7 and 9 recite relevant limitations similar to those recited in independent claim 1 and, therefore, for at least the same reasons discussed above, Zheng, Hayee and Lee, alone or in any permissible combination, fail to teach or suggest Applicants' invention of claims 3, 4, 6, 7 and 9, as a whole.

As such, independent claims 1, 3, 4, 6, 7 and 9 are allowable over Zheng, Hayee and Lee under 35 U.S.C. 103. Furthermore, since all of the dependent claims that depend from independent claims 1, 3, 4, 6, 7 and 9 include all the limitations of the respective independent claim from which they ultimately depend, each such dependent claim is also allowable over Zheng, Hayee and Lee under 35 U.S.C. 103.

Therefore, the Examiner's rejection should be withdrawn.

Secondary References

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to Applicants' disclosure than the primary references cited in the Office Action. Therefore, Applicants believe that a detailed discussion of the secondary references is not necessary for a full and complete response to this Office Action.

Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, the Examiner is invited to call Eamon Wall at (732) 530-9404 so that arrangements may be made to discuss and resolve any such issues.

Respectfully submitted,

Dated: 3/16/07

Eamon J. Wall
Registration No. 39,414
Attorney for Applicants

PATTERSON & SHERIDAN, LLP
595 Shrewsbury Avenue, Suite 100
Shrewsbury, New Jersey 07702
Telephone: 732-530-9404
Facsimile: 732-530-9808